METHODS AND APPARATUS FOR ESTIMATING PHYSICAL PARAMETERS OF RESERVOIRS USING PRESSURE TRANSIENT FRACTURE INJECTION/FALLOFF TEST ANALYSIS

ABSTRACT OF THE DISCLOSURE

[00129] A before-closure pressure-transient leakoff analysis for a fracture-injection/falloff test is used to mitigate the detrimental effects of pressure-dependent fluid properties on the evaluation of physical parameters of a reservoir. A fracture-injection/falloff test consists of an injection of liquid, gas, or a combination (foam, emulsion, etc.) containing desirable additives for compatibility with the formation at an injection pressure exceeding the formation fracture pressure followed by a shut-in period. The pressure falloff during the shut-in period is measured and analyzed to determine permeability and fracture-face resistance by preparing a specialized Cartesian graph from the shut-in data using adjusted pseudodata such as adjusted pseudopressure data and time as variables in a first method, and adjusted pseudopressure and adjusted pseudotime data as variables in a second method. This analysis allows the data on the graph to fall along a straight line with either constant or pressure-dependent fluid properties. The slope and the intercept of the straight line are respectively indicative of the permeability k and fracture-face resistance evaluations R_0.